

ABSTRACT OF THE DISCLOSURE

A global path identifier is assigned to each explicit route through a data communication network. This global path identifier can be obtained by performing the bitwise Exclusive OR function of all of the unique identifiers, such as IP addresses, of all the nodes along each explicit route. The global path identifier is inserted into each packet as the packet enters a network, and is used in selecting the next hop by a router's forwarding engine. Explicit routes can be selected either by a policy server or by ingress routers. When encountering a new selected path, an ingress router sends an explicit object to downstream nodes of the path to set up explicit routes by caching the next hop in an Explicit Forwarding Information Base ("EFIB") table in each router along the route. Two explicit routes that merge at a network node will share the same entry in the EFIB tables in all downstream nodes. Ingress routers maintain an Explicit Route Table ("ERT") table that tracks the global path identifier associated with each flow through the data communication network. Multiple flows using the same path can be implemented by sharing the same global path identifier in the table. In case of sudden network load changes, rerouting can be performed by changing the global path identifier associated with those flows that need to be rerouted, and by then transmitting a new path object to downstream nodes.